Abstract ID : 800

Title : BOTTLENOSE DOLPHIN DENSITIES IN THE GALVESTON BAY ESTUARY: CLASSIFICATION WITH A MINIMAL SET OF ENVIRONMENTAL VARIABLES

Category : Ecology

Student : Doctoral

Preferred Format : Oral Presentation

Abstract : Estuaries are important habitats for coastal bottlenose dolphins, particularly along the US Atlantic and Gulf coasts, where estuaries comprise 80 to 90% of the coastline. Although we have begun to understand how meso-scale oceanographic features such as gyres and other current systems influence the offshore distribution of cetaceans, the factors underlying cetacean distribution in estuaries is poorly known. This is largely due to the complexity of the physical environment, with changes occurring on an hourly to seasonal basis, combined with human activities that, directly or indirectly, influence cetacean distribution. Over 1,000 bottlenose dolphins have been identified in the Galveston Bay Estuary (GBE), which consists of extensive shallow areas and dredged channels, and intensive boat traffic. Our study investigates whether environmental variables are good predictors of bottlenose dolphin density at local scale, on the order of the GBE. We also compare the predictive value of human-related variables (density of shrimpers, boat traffic) with the performance of physical variables (salinity, water temperature, depth, distance to the Gulf). Boat surveys (n=155) conducted on a monthly basis from October 2000 to December 2001 followed pre-defined routes to estimate relative densities of dolphins and shrimpers, and to measure environmental parameters at twenty-three stations. All variables, except turbidity and water temperature, differed significantly with dolphin density ($p < 0.005$). A parsimonious linear discriminant model was obtained that reduced the initial array of seven physical and human related variables to a 2-dimensional model. The model generated exclusively with physical variables (Group 1) performed better than the model with human-related variables (Group 2). We demonstrate that the heterogeneity of dolphin density in estuaries can be accounted for successfully by a small number of environmental variables. This approach highlights the combination of variables that are relevant in understanding bottlenose dolphin distribution in estuaries, and possibly also in adjacent coastal waters.